

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application.

Claims 40-63 are now present in this application. Claims 40, 48 and 56 are independent. Reconsideration of this application, as amended, is respectfully requested.

Interview Summary

The courtesies extended to Applicants' representative during the interview on July 6, 2009 are acknowledged with appreciation. During the interview, the prior art disclosure and the differences between the prior art and the invention were discussed.

Rejection Under 35 U.S.C. §103

Claims 1-5, 7, 9-14, 18-23 and 34-39 stand rejected under 35 U.S.C. § 103(a) as being obvious over Mayumi in view of Braunlein. Further, claims 6 and 16 stand rejected as obvious over Mayumi in view of Braunlein and Aoshima et al. and claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Mayumi in view of Braunlein and Ueno et al. Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Mayumi in view of Braunlein and Atsumi et al. These rejections are respectfully traversed.

Complete discussions of the Examiner's rejections are set forth in the Office Action, and are not being repeated here.

While not conceding the appropriateness of the Examiner's rejection, but merely to advance prosecution of the instant application. Applicants respectfully submit that claims 1-16 and 18-23 and 34-39 have been cancelled, thus rendering this rejection under 35 U.S.C. § 103 moot. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

New Claims

Claims 40-63 have been added for the Examiner's consideration.

Independent claim 40 recites a combination of elements in a stepping motor including a bracket including a first supporting unit and a third supporting unit, a housing including a first

portion coupled to the third supporting unit, a second portion connected to the first portion, and a third portion integrally formed on the second portion, a stator including a first stator faced with the first portion of the housing and a second stator faced with the second portion of the housing. The stator is disposed in the housing to form an electric field, a magnet faced with the stator and configured to provide a magnetic field, a shaft having a lead screw and rotating with the magnet. The shaft is rotatably supported by the first supporting unit, a second supporting unit disposed in the third portion of the housing and a stopper coupled to the third portion of the housing and configured to elastically support the shaft together with the second supporting unit and to prevent the second supporting unit from being removed out from the third portion of the housing, wherein an inner surface of the stopper is contacted with an outer surface of the third portion of the housing.

Applicants respectfully submit that this combination of elements as set forth in independent claim 40 is not disclosed or made obvious by the prior art of record.

According to the present application, the third portion of the housing provides a path in which the second supporting unit is inserted and installed, and the stopper is coupled to the third portion of the housing to prevent the second supporting unit from being removed out.

With regards to Mayumi, a bearing 41 is not disposed within a case 28, but disposed within a separate cap member 25. The cap member 25 does not correspond to the third portion of the housing of the present application. The cap member 25 is additionally attached to the case 28. The cap member 25 is integrally molded with coil bobbin 18. Thus, the cap member 25 is completely different from the third portion of the housing of the present application.

The separate cap member 25 is required separate from the case 28, making the shaft supporting structure complicated, and degrading the assembling precision and the coaxiality of the stepping motor. Since an insert-molding process is performed to form the cap member 25, the manufacturing process may be complicated, and the manufacturing costs may increase and decrease the precision of the manufacturing. In addition, the cap member 25 may be weak against external impacts due to a coupling structure of a molding material.

Braeunlein et al. discloses a protruded portion 3 of the housing for guiding a supporting unit for supporting a shaft but the protruded portion 3 of the housing is completely different from

the third portion of the housing of the present application. The protruded portion 3 of the housing does not have an opening portion for inserting the supporting unit in a right direction. Thus, differing from the present application, the supporting units may not be installed through the opening portion, and thus, the supporting units should be installed through a left direction in which a shaft is disposed. Also, the stopper to be coupled to the housing is not disclosed, and a structure in which the stopper has no need to be coupled is provided. Thus, the protruded portion 3 protruding from the housing in Braeunlein et al. does not provide the same function as the third portion of the housing and the stopper.

The cited references fail to teach or suggest the stopper coupled to the third portion of the housing and configured to elastically support the shaft together with the second supporting unit. Mayumi merely teaches a urging member 43 coupling to a cap member 25 molded with coil bobbin 18 and attached to the case 28. The cap member 25 does not correspond to the third portion of the housing. Braeunlein et al does not disclose a stopper to be coupled to the housing. The structure has no need the stopper to be coupled.

The Examiner rejected the claims of the present invention as obvious over Mayumi and Braeunlein. However, as described above, Mayumi and Braeunlein do not completely correspond to those of the present application, the rejection based on Mayumi and Braeunlein should be withdrawn. Since the cap member 25 of Mayumi is not the housing, it is not suitable to replace the guide structure of Braeunlein with the cap member 25 of Mayumi. Also, since the guide structure of Braeunlein has a structure not needing a stopper, the guide structure of Braeunlein is not replaceable with the cap member 25 of Mayumi. Also, the structure of Braeunlein has shaft 4 protruding from both sides and to which the stopper cannot be not coupled.

According to the stepping motor of the present application, the second supporting unit is inserted and installed through the third portion of the housing and the stopper is provided to prevent the second supporting unit from being removed out from the third portion of the housing. Thus, the coupling characteristics between the housing and the stopper may not be easily realized through Mayumi and Braeunlein by those having ordinary skill in the art.

The cited references fail to teach or suggest that an inner surface of the stopper is contacted with an outer surface of the third portion of the housing.

In addition, the cited references fail to teach or suggest that the second supporting unit, the third portion of the housing, and the stopper are overlapped in a plane perpendicular to a axis direction of the shaft.

Lastly, the cited references fail to teach or suggest that the second section of the third portion of the housing is as large as the second supporting unit can be inserted and installed at the third portion of the housing, and wherein a first portion of the stopper is contacted with a side surface of the third portion of the housing and wherein a second portion of the stopper is contacted with an outer surface of the third portion of the housing.

New independent claim 48 further recites that the second supporting unit, the third portion of the housing, and the stopper are overlapped in a plane perpendicular to an axis direction of the shaft. This feature is not disclosed or suggested by the prior art of record. New independent claim 56 also further recites that the second section of the third portion of the housing is as large as the second supporting unit can be inserted and installed at the third portion of the housing, and that a first portion of the stopper is contacted with a side surface of the third portion of the housing and wherein a second portion of the stopper is contacted with an outer surface of the third portion of the housing.

Applicants respectfully submit that the combinations of elements as set forth in independent claims 40, 48 and 56 are not disclosed or made obvious by the prior art of record, including Mayumi and Brauelcin, for the reasons explained above. Accordingly, reconsideration and withdrawal of this rejection are respectfully requested.

With regard to dependent claims 41-47, 49-55 and 57-63, Applicants submit that these claims depend, either directly or indirectly, from independent claim 40, 48 or 56 which are allowable for the reasons set forth above, and therefore are allowable. In addition, these claims recite further limitations which are not disclosed or made obvious by the applied prior art references. Reconsideration and allowance thereof are respectfully requested.

Conclusion

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all

presently outstanding rejections and that they be withdrawn. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance.

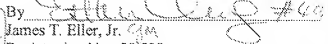
If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone Chris McDonald, Registration No. 41,533, at (703) 205-8000, in the Washington, D.C. area.

Prompt and favorable consideration of this Amendment is respectfully requested.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

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